CLAIMS

What is claimed is:

1       1.      A method of stable incremental layout of a hierarchical graph
2       comprising:
3       determining a level of the layout for each new node of the graph using
4       information about hidden nodes of the graph;
5       determining positions of nodes on levels of the layout using information
6       about hidden nodes of the graph; and
7       determining coordinates of new nodes in the layout without using
8       information about hidden nodes.
9

1       2. The method of claim 1, further comprising inserting new levels of the
2       layout between existing levels when a new level is needed to contain a new
3       node.
4

1       3. The method of claim 2, wherein nodes on existing levels retain
2       positions on the existing levels.
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1       4. The method of claim 1, wherein the determining steps are performed
2       to minimize visual changes in the layout as compared to an initial layout of the
3       graph.
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1       5. The method of claim 1, further comprising complying with quality
2       criteria.
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1       6. The method of claim 1, wherein the quality criteria comprises
2       minimization of edge crossings of the layout.
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1       7.  The method of claim 1, wherein the quality criteria comprises
2   minimization of back edges of the layout.
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1       8.  An article comprising: a storage medium having a plurality of machine
2   accessible instructions, wherein when the instructions are executed by a
3   processor, the instructions provide for stable incremental layout of a hierarchical
4   graph by determining a level of the layout for each new node of the graph using
5   information about hidden nodes of the graph, determining positions of nodes on
6   levels of the layout using information about hidden nodes of the graph, and
7   determining coordinates of new nodes in the layout without using information
8   about hidden nodes.
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1       9.  The article of claim 8, further comprising instructions to insert new
2   levels of the layout between existing levels when a new level is needed to
3   contain a new node.
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1       10.  The article of claim 9, wherein nodes on existing levels retain
2   positions on the existing levels.
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1       11.  The article of claim 8, wherein the determining instructions are
2   executed to minimize visual changes in the layout as compared to an initial
3   layout of the graph.
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1       12.  The article of claim 8, further comprising complying with quality
2   criteria.
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1       13.  The article of claim 8, wherein the quality criteria comprises
2   minimization of edge crossings of the layout.
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1       14.  The article of claim 8, wherein the quality criteria comprises
2   minimization of back edges of the layout.

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1        15.     A method of stable incremental layout of a hierarchical graph

2   having nodes and edges comprising:

3        generating an initial layout of the graph; and

4        generating, as a result of a change in the graph, an incremental layout of

5        the graph based on the initial layout by performing

6               for each new node of the graph, determining a level of the

7        incremental layout using information about hidden nodes of the graph,

8        and inserting a new level in the incremental layout between existing levels

9        when the new level is needed to contain the new node;

.10              for each level, determining positions of new nodes on each level of

11      the incremental layout using information about hidden nodes of the graph;

12      and

13              for each level, determining coordinates of new nodes in the

14      incremental layout without using information about hidden nodes.

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1        16.  The method of claim 15, wherein nodes on existing levels retain

2   positions on the existing levels.

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1        17.  The method of claim 15, wherein the determining steps are

2   performed to minimize visual changes in the incremental layout as compared to

3   an initial layout of the graph.

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1        18.  The method of claim 15, further comprising complying with quality

2   criteria, wherein the quality criteria comprises at least one of minimization of

3   edge crossings, and minimization of back edges.

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1        19. An article comprising: a storage medium having a plurality of machine

2   accessible instructions, wherein when the instructions are executed by a

3   processor, the instructions provide for stable incremental layout of a hierarchical

4   graph by

5    generating an initial layout of the graph; and

6    generating, as a result of a change in the graph, an incremental layout of

7    the graph based on the initial layout by performing

8        for each new node of the graph, determining a level of the

9    incremental layout using information about hidden nodes of the graph,

10    and inserting a new level in the incremental layout between existing levels

11    when the new level is needed to contain the new node;

12        for each level, determining positions of new nodes on each level of

13    the incremental layout using information about hidden nodes of the graph;

14    and

15        for each level, determining coordinates of new nodes in the

16    incremental layout without using information about hidden nodes.

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1        20.  The article of claim 19, wherein the determining instructions are

2    executed to minimize visual changes in the incremental layout as compared to

3    an initial layout of the graph.

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1        21.  The article of claim 19, further comprising complying with quality

2    criteria, wherein the quality criteria comprises at least one of minimization of

3    edge crossings, and minimization of back edges.

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